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| 09/880,584      | 06/13/2001  | Stephen P. DeOrnellas | TEGL 01071US3 SRM   | 8818             |

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| EXAMINER |
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GOUDREAU, GEORGE A

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| ART UNIT | PAPER NUMBER |
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1763

DATE MAILED: 08/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09-889584

Applicant(s)

De Ornellas et al

Examiner

George Goudreau

Group Art Unit

1763

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- ☒ Responsive to communication(s) filed on (6-01' to 6-03') (i.e., papers #1-5)
- ☐ This action is FINAL.
- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) 39-64 is/are pending in the application.
- Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☒ Claim(s) 39-64 is/are allowed.
- ☐ Claim(s) \_\_\_\_\_ is/are rejected.
- ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).
- ☐ All ☐ Some\* ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
- ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
- ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 5
- ☒ Notice of Reference(s) Cited, PTO-892
- ☐ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Interview Summary, PTO-413
- ☐ Notice of Informal Patent Application, PTO-152
- ☐ Other \_\_\_\_\_

Office Action Summary

Art Unit: 1763

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103<sup>®</sup> and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 39-53, and 56-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over by any of Ohno et. al. (6-1989'), or Kinoshita (JP 07-130,712).

Ohno et. al. disclose a process for rie etching Cu on a wafer in a plasma comprised of (SiCl<sub>4</sub> + N<sub>2</sub>) with the wafer heated to a temperature of at least 250 C in order to improve the profile of the etched Cu layer. A resistance heater embedded in the wafer chuck which is located inside the rie apparatus is used to

Art Unit: 1763

heat the wafer to a temperature of at least 250 C. This is discussed on pages L1070-L1072. This is shown specifically in figures 1-2; and shown in general in figures 1-5.

Kinoshita disclose a process for rie etching Pt on a wafer using a plasma comprised of Cl<sub>2</sub> with the wafer heated to a temperature of at least 350 C in order to improve the profile of the etched Pt layer. A resistance heater embedded in the wafer chuck which is located inside the rie apparatus is used to heat the wafer to a temperature of at least 350 C. This is discussed specifically in the abstract; and discussed in general in columns 1-6. This is shown in figures 1-3.

The references as applied above fail, however, to specifically disclose the following aspects of applicant's claimed invention:

- the specific usage of a thermal transfer gas such as He which is supplied to the back surface of a wafer to be rie etched on top of a cathode with the specific He gas pressures claimed by the applicant;
- the specific wafer temperature claimed by the applicant for their etch process; and
- the specific rate of heating up of the wafer during the beginning of the etch process in which the wafer temperature is ramped up

It would have been obvious to one skilled in the art to employ a heated cathode which is equipped with means for supplying a thermal transfer gas such as He to the back surface of the wafer to be etched via the cathode in any of the etching processes which are taught above based upon the following. The usage

Art Unit: 1763

of a heated cathode equipped with means for supplying a thermal transfer gas such as He to the backside of a wafer to be rie etched on the cathode in order to control the final temperature of the wafer to be etched is conventional or at least well known in the semiconductor processing arts. (The examiner takes official notice in this regard.) Further, this would simply provide an obvious way to desirably improve the heat transfer between the wafer to be rie etched; and the heated wafer support (IE.-the cathode).

It would have been prima facie obvious to employ any of a variety of different thermal gas (IE.-He gas) pressures in the wafer chuck employed in any of the etching processes which are taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

It would have been prima facie obvious to employ any of a variety of wafer temperatures during the etching processes taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

It would have been prima facie obvious to employ any of a variety of different rates of heating up the wafer at the beginning of any of the etching processes taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

4. Claims 54-55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinoshita as applied in paragraph 3 above.
5. Claims 39-53, and 56-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over Krogh et. al. (1990').

Krogh et. al. (1990') disclose a process for rie etching Si on a wafer using a plasma comprised of ( $\text{CHCl}_3 + \text{N}_2$ ). The wafer is supported in the rie apparatus by a wafer chuck. The wafer is clamped to the chuck which has helium gas supplied to it at a pressure between (1-9) torr. The He gas contacts the back surface of the wafer which faces the wafer chuck; and acts as a heat transfer gas between the wafer, and the wafer chuck. The wafer is maintained at a temperature of (86-116) C. The pressure of the He gas supplied to the wafer chuck is decreased from (9 torr to 1 torr) which leads to an increase in the temperature of the wafer from (86 C to 116 C). This is discussed specifically on pages 231-234, 239-240; and discussed in general on pages 213-245. This is

Art Unit: 1763

shown specifically in figures 1-2. Krogh et. al. fail, however, to specifically disclose the following aspects of applicant's claimed invention:

- the specific usage of a resistance heater embedded inside the cathode wafer support to heat up the wafer during the etching process;
- the specific usage of a thermal transfer gas such as He with the specific gas pressures claimed by the applicant;
- the specific wafer temperature claimed by the applicant for their etch process; and
- the specific rate of heating up of the wafer during the beginning of the etch process in which the wafer temperature is ramped up

It would have been obvious to one skilled in the art to employ a resistance heater which is embedded inside the cathode support to optionally heat up the wafer during the etching process based upon the following. The usage of resistance heater means which are embedded in a cathode support to heat a wafer during a rie etching process is conventional or at least well known in the rie etching arts. (The examiner takes official notice in this regard.) Further, this simply provides additional means for raising the temperature of the wafer to a targeted temperature range during the rie etching process taught above to those means which are specifically taught above. The examiner cites the case law listed below of interest to the applicant in this regard.

In re Crokett 126 U.S.P.Q. 186 (CCPA ) states that where the prior art teaches the use of two materials for the same purpose, it would have been

Art Unit: 1763

obvious to one of ordinary skill in the art to use the two materials in combination for the same purpose.

It would have been prima facie obvious to employ any of a variety of different thermal gas (IE.-He gas) pressures in the wafer chuck employed in the etching process which is taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

It would have been prima facie obvious to employ any of a variety of wafer temperatures during the etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

It would have been prima facie obvious to employ any of a variety of different rates of heating up the wafer at the beginning of the etching process taught above including those which are specifically claimed by the applicant. These are all well known variables in the plasma etching art which are known to effect both the rate and quality of the plasma etching process. Further, the



Art Unit: 1763

selection of particular values for these variables would not necessitate any undo experimentation which would be indicative of a showing of unexpected results.

6. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

7. Claims 39-64 are rejected under 35 U.S.C. 101 as claiming the same invention as that of claims 1-37 of prior U.S. Patent No. 6,046,116. This is a double patenting rejection.

8. In the advent that applicant feels that the DP rejection of their claimed subject matter is inappropriate, the examiner will make the following ODP rejection of applicant's claims. (The examiner does believe, however, that applicant's claims should be properly rejected under DP as opposed to under ODP.)

9. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

Art Unit: 1763

A timely filed terminal disclaimer in compliance with 37 CFR 1.321<sup>®</sup> may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

10. Claims 39-64 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-37 of U.S. Patent No. 6,046,116. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following.

US patent 6,046,116 essentially claims the same subject matter as that which is claimed in the pending application.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner George A. Goudreau whose telephone number is (703) -308-1915. The examiner can normally be reached on Monday through Friday from 9:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, Examiner Gregory Mills, can be reached on (703) -308-1633. The appropriate fax phone number for the organization where this application or proceeding is assigned is (703) -306-3186.

Art Unit: 1763

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) -308-0661.



George A. Goudreau/gag

Primary Examiner

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